MULTI-DISC SERVO TRACK WRITER VIBRATION ISOLATION METHOD AND APPARATUS

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Related Applications

This application is a continuation of U.S. Patent Application Serial No. 10/039,011, filed on January 2, 2002, which claims priority of U.S. Provisional Application Serial No. 60/295,275, filed June 1, 2001.

Field of the Invention

This application relates generally to magnetic disc drives and more particularly to an actuator assembly having a gas bearing for accurately positioning transducers during servo-pattern recording.

Background of the Invention

Disc drives are data storage devices that store digital data in magnetic form on a rotating storage medium on a disc. Modern disc drives comprise one or more rigid discs that are coated with a magnetizable medium and mounted on the hub of a spindle motor for rotation at a constant high speed. Information is stored on the discs in a plurality of concentric circular tracks typically by an array of transducers ("heads") mounted to a radial actuator or actuator arm for movement of the heads relative to the discs. Transducers are used to transfer data between a desired track and an external environment. During a write operation, sequential data is written onto the disc track and during a read operation, the head senses the data previously written onto the disc track and transfers the information to the external environment. Important to both of these operations is the accurate and efficient positioning of the head relative to the center of the desired track. Head positioning within a desired track is dependent on head-positioning servo-patterns, *i.e.*, a pattern of data bits used to maintain optimum track spacing and sector timing. Servo-patterns can be recorded between the data sectors on each track of a disc, termed embedded servo, or on one dedicated surface of a disc within the disc drive, termed dedicated servo.

Servo-patterns are typically recorded on a target disc during the manufacturing of the disc drive, by a servo-track writer (STW) assembly. There are basically two conventional methods for

recording servo-pattern onto a disc for use in a disc drive. In one method, an STW assembly is attached to a disc drive having a disc pack and read/write heads mounted in their proper positions. The mounted disc on the disc pack has not been pre-recorded with servo-pattern. The STW assembly attaches to the assembled disc drive and, using the actual drive's read/write heads, records the requisite servo-pattern directly to the mounted disc. Alternatively, and potentially more cost effectively, servo-pattern can be recorded onto a plurality of disc prior to the discs being mounted into a disc drive assembly. In this method, a multi-disc servo-track writer, having dedicated read/write heads or servo-recording heads records the servo-pattern onto each disc. One or more discs are simultaneously prepared within the dedicated apparatus, allowing for the high throughput output of servo ready discs. The prerecorded discs are then assembled into the drives.

Recent efforts within the disc drive industry have focused on developing cost effective disc drives capable of storing more data onto existing or smaller sized disc surfaces. One potential way of increasing data storage on a disc surface is to increase the recording density of the disc surface by increasing the track density (tracks per millimeter (tpmm)). Increased track density requires more closely spaced, narrow tracks, which in turn requires increased accuracy in recording servo-pattern onto the target disc surface. This increased accuracy requires that servo-track recording be accomplished within the increased tolerances, but remain cost effective.

Dedicated multi-disc servo-track writers have traditionally utilized servo-recording heads that are positioned on a target disc surfaces by pivoting and rotation in a radial path across the disc. The rotation of each head is typically accomplished by pivoting of an E-block within the writer, where the E-block rotates on ball bearings. Ball bearings, although effective for some existing devices, have limitations as to how precisely the servo-recording head can be position on a disc surface. For example, ball bearings often suffer from lobing, due to imperfections in the roundness of the ball bearings or smoothness of the races, which results in unwanted vibration in the servo-recording heads during servo-track recording. In addition, ball bearings suffer from a fair level of eccentricity, thereby adding a level of uncertainty as to the exact rotational movement and position of the servo-recording heads in relation to the axis of rotation. These imperfections in the manner in which the servo-recording heads are position result in an unacceptable level of accuracy, especially in light of the trend toward higher track density, cost effective, discs.

There has been a long felt but unrecognized need, in high density servo-track writing, for a mechanism to orient servo-recording heads in a substantially vibration-free manner, simultaneously maintaining a low eccentricity in their movements. Such a mechanism would allow for more accurate and cost effective recording of servo-patterns to disc surfaces and thereby allow for increases in disc track densities beyond present technology limitations. Against this backdrop the present invention has been developed.

Summary of the Invention

Embodiments of the present invention include an apparatus and method for reducing eccentricity in a rotary actuator positioning a read/write head over a disc within a multi-disc servo-track writer (MDW). One embodiment of the present invention is a multi-disc track writer for recording information on one or more data storage discs. The writer may include an actuator assembly with an actuator block having a cavity therein and a rotational gas bearing housed within the cavity for supporting an E-block having one or more elongated actuator arms each carrying a data transducer.

The actuator assembly preferably has a translational gas bearing formed on a bottom face of the actuator block operable when moving the actuator assembly over a platform surface between a first servo-recording position and a second disc loading and unloading position. A slide mechanism can be used for laterally moving the actuator block on a gas cushion provided by the translational gas bearing between the first and second positions. The actuator assembly rotational gas bearing can have a rotatable spindle and an adaptor plate fastened between the rotatable spindle of the rotational gas bearing and an E-block assembly carrying the transducers.

Another embodiment of the present invention is a method for positioning a servo-recording head over a disc in a multi-disc track writer. The method includes the steps of:

(a) applying gas pressure to a translational gas bearing on a bottom face of the actuator block to provide a float between the actuator assembly and the platform;

(b) laterally moving the actuator assembly on the translational gas bearing to a servo-recording position;

(c) removing the gas pressure from the translational gas bearing;

(d) pulling a vacuum on the translational gas bearing to immobilize the actuator assembly against the platform surface in the servo-recording position;

(e) applying gas pressure to a rotational gas bearing in the actuator block, the rotational gas bearing supporting the servo-recording head; and

(f) rotating the servo-recording head on the rotational gas bearing.

These and various other features as well as advantages which characterize the present invention will be apparent from a reading of the following detailed description and a review of the associated drawings.

Brief Description of the Drawings

FIG. 1 is a plan view of a disc drive having a disc prepared using an embodiment of the present invention.

FIG. 2 is a schematic plan view of a multi-disc servo-track writer (MDW) incorporating an actuator assembly in accordance with an embodiment of the present invention.

FIG. 3 is a perspective view of the MDW in **FIG. 2**.

FIG. 4 is a separate perspective exploded actuator end view of the actuator assembly in **FIG. 2** in accordance with one embodiment of the present invention.

FIG. 5 is a perspective exploded rear view of the actuator assembly shown in **FIG. 3**.

FIG. 6 is a bottom view of the actuator assembly shown in **FIG. 4**.

FIG. 7 is an enlarged cross-sectional view through the actuator block taken along line **5-5** in **FIG. 6**.

FIG. 8 is a close-up perspective view of the MDW above in **FIG. 2** with disc pack on the spindle motor hub with the spindle motor removed in accordance with a preferred embodiment of the present invention.

FIG. 9 is a process flow diagram of the steps for servo writing a disc pack in a servo-track writer in accordance with one embodiment of the present invention.

Detailed Description

A disc drive **100** having a disc manufactured in accordance with the present invention is shown in **FIG. 1**. The disc drive **100** includes a base **102** to which various components of the disc drive **100** are mounted. A top cover **104**, shown partially cut away, cooperates with the base **102** to form an internal, sealed environment for the disc drive **100** in a conventional manner. The components include a spindle motor **106** that rotates one or more discs **108** at a constant high

speed. Information is written to and read from tracks, as illustrated by broken line **109**, on the discs **108** through the use of an actuator assembly **110**, which rotates about a bearing shaft assembly **112** positioned adjacent the discs **108**. The actuator assembly **110** includes a plurality of actuator arms **114** which extend towards the discs **108**, with one or more flexures **116** extending from each of the actuator arms **114**. Mounted at the distal end of the flexures **116** is a head **118** that includes an air bearing slider (not shown) enabling the head **118** to fly in close proximity above the corresponding surface of the associated disc **108**. The head **118** includes a writing element, i.e., write head, to record information to the disc **108** and a reading element, i.e., read head, to transfer data from the disc **108** to the host computer (not shown).

The radial positioning of the heads **118** is controlled through the use of a voice coil motor **120**, which typically includes a coil **122** attached to the actuator assembly **110**, as well as one or more permanent magnets **124**, which establish a magnetic field in which the coil **122** is immersed. The controlled application of current to the coil **122** causes a magnetic interaction between the permanent magnets **124** and the coil **122** so that the coil **122** moves in accordance with the well-known Lorentz relationship. As the coil **122** moves, the actuator assembly **110** pivots about the bearing shaft assembly **112** and the heads **118** are caused to move across the surfaces of the discs **108**.

Proper orientation of the heads **118** over the disc surface relies upon pre-recorded servo-patterns on the disc. The present invention provides a method for recording servo-pattern to a disc **108** as well as an actuator assembly **134** having a pair of air bearings (see below) for the accurate positioning and movement of servo-recording heads during servo-pattern recording on a disc. Typically, servo-pattern is recorded onto disc **108** during the manufacture of the disc drive **100**. A dedicated servo writing apparatus, termed a multi-disc servo-track writer **136**, can be used to record servo-pattern onto the disc surfaces. These discs are then assembled into disc drives **100** during the manufacturing process of a number of discs **108** simultaneously.

FIGS. 2 - 8 illustrate an actuator assembly **134** in a multi disc servo-track writer **136** in accordance with an embodiment of the present invention. **FIGS. 2** and **3** show one potential multi-disc servo-track writer **136** for use with the present invention. The multi-disc servo-track writer **136** includes an actuator assembly **134** for moving the servo-recording heads **140** (see **FIGS. 3** and **7**) necessary for recording servo-patterns onto a stack of target discs **108**. A spindle hub assembly **142** attached to a spindle motor **143** vertically positions one or more target discs

108 onto which the servo-pattern is to be recorded. A vacuum chuck **144** rigidly secures the actuator assembly **134** in a desired position for servo-track writing and fastens the spindle hub assembly to the spindle motor **143**. A laser transducer system **146** measures the angular displacement and consequent positioning of the servo-recording heads **140** of the actuator assembly **134** for servo-pattern recording. These components of the multi-disc servo writer **136** are fastened to a flat, rigid base or platform **148**. The platform **148** is preferably a granite slab, as is shown in **FIG. 3**.

The accuracy of the servo-pattern recorded on a disc surface **138** relies upon, among other things, the vibration free positioning and movement of the servo-recording heads **140** over target disc **108** locations. Accurate positioning and vibration free movement of the servo-recording heads in turn depends upon the accurate movement positioning of the actuator assembly **134** in relation to the target discs **108** as well as the smooth, vibration free movements of the recording heads **140** over the disc surface **138**, *i.e.*, the heads move with reduced vibration and eccentricity over a target disc surface as compared to the conventional movement of servo-recording heads. Embodiments of the present invention provide an actuator assembly **134** for use in a multi-disc servo-track writer **136**, having a translational air bearing **150** (see **FIG. 4**) for the lateral positioning of the actuator assembly **134** within the multi-disc servo-track writer **136**, and a rotational air bearing **152** (see **FIG. 4**) for the rotation of the servo-recording head(s) **140** on the actuator assembly **134** over disc surfaces **138** within the multi-disc servo writer **136**. The combination of air bearings **150** and **152** provides the actuator assembly **134** with enhanced positional accuracy, and the servo-recording heads **140** with reduced vibrational noise and eccentricity during servo-track recording.

Continuing to refer to **FIGS. 2** and **3**, the multi-disc servo-track writer **136** is secured to a flat surface of a substantially immobile platform **148**. The actuator assembly **134** is connected to the platform **148** via a slide mechanism **154** for lateral movement of the actuator assembly **134**, as indicated by arrow **156**, over the platform **148** between a servo-recording position **158** and disc loading and un-loading position **160**. The actuator assembly **134** is shown in the disc unloading position in **FIG. 3**. The actuator assembly **134** is shown in the servo-recording position **158** in **FIGS. 2** and **8**.

The spindle motor hub assembly **142** and vacuum chuck **144** are both fastened to the platform **148**. Note that the actuator assembly **134** and spindle hub assembly **142** are positioned

in a head-to-head fashion for rotations about parallel horizontal axes. The spindle hub assembly **142** vertically positions one or more discs **108** for the simultaneous writing of servo-pattern onto each disc **108** by servo-recording heads **140** located on the actuator assembly **134** (see **FIGS. 3** and **8**). The vacuum chuck **144** is rigidly secured in proximity to the actuator assembly **134** to pull a vacuum on the translational air bearing **150** of the actuator assembly **134** and thereby secures the servo-recording position **158** or disc loading and unloading position **160**.

In general, target discs **108** are assembled into a multiple disc pack that is mounted to the spindle motor hub assembly **142** where the actuator assembly **134** is moved laterally into position **158** for servo-recording. Servo-recording heads **140** on the actuator assembly **134** are rotated over the mounted disc surface **138** and servo-pattern recorded, the servo-recording heads **140** are rotated off of the disc surface **138**, and the actuator assembly **134** moved laterally away from the mounted disc for unloading and use in a disc drive **100**.

An embodiment of the actuator assembly **134**, in accordance with the present invention, is shown in **FIG. 4**. The actuator assembly **134** includes an actuator block **162** housing a rotational air bearing **152**, a translational air bearing **150**, an E-block assembly **164** that includes an E-block **166**, a series of one or more actuator arms **240** carrying recording heads **140** thereon, a DC torque, brushless motor **168** (see **FIG. 2**) or like motor **246** (see **FIGS. 3** and **5**) for actuating the rotational air bearing **152**, a sliding mechanism **154** for translational movement of the actuator block **162**, and a laser transducer assembly **146** for coordinating the motor's movement with the servo-recording head's position. In preferred embodiments, the actuator assembly **134** also includes an adaptor plate **170** coupling the E-block assembly **164** to the rotational air bearing **152**, as described in greater detail below.

With continued reference to **FIG. 4**, the actuator block **162** of the actuator assembly **134** has a generally cube-like shape housing having a cavity or chamber **172** for receiving the rotational air bearing **152** and associated DC torque, brushless motor **168** therein. The actuator block **162** defines two aligned circular-like openings, an opening **174** on the front face of the actuator block that faces toward the spindle hub motor assembly and a second opening (not shown) on the opposite or back face of the actuator block **162**. The openings are of sufficient diameter to receive the rotational air bearing **152** and DC torque brushless motor. (See **168** in **FIG. 2** or **246** in **FIG. 5**).

The slide mechanism **154** is used, in coordination with the translational air bearing **150**, to laterally move the actuator assembly **134** over the base **148** toward and away from the spindle motor hub assembly **142**. The slide mechanism **154** attaches to a lower edge **174** of a side face **176** of the actuator assembly **134**, and preferably to a lower edge of the side face adjacent the vacuum chuck **144**. The slide mechanism **154** includes a pneumatically sliding cylinder **178** attached to the platform **148** by a flexure or bracket **180**. A pair of stops **182** extend along the lower edge **174** of the side face **176** of the actuator block **162** on opposite sides of the actuator block attached sliding mechanism. Each stop **182** extends beyond the front face **184** and back face **186** of the actuator block **162**. A pair of catch block **187** is positioned on the platform **148** on opposite sides of the actuator block **162** to contact each stop when the sliding mechanism **154** laterally moves the actuator assembly **134** to the servo-recording position **158** on the platform.

The rotational air bearing **152** has an inner, freely rotatable spindle **188** contained within an outer, non-rotating race **190**. The interface between the spindle **188** and outer race **190** provides a chamber (not shown) for receiving pressurized air, thereby creating a substantially frictionless air float, allowing the substantially frictionless rotation of the spindle **188** in relation to the outer race **190**. An air port **192** in the outer race **190** provides communication between an external air source (not shown) and the chamber (not shown) formed between the spindle **188** and outer race **190**. The air port **192** extends outwardly from the outer race **190** and fits through an opening **194** in the top surface **196** of the actuator block **162**. One conventional rotational air bearing that may be used in the present invention is manufactured by Precision Instruments, Inc.

A doughnut shaped first clamp **198** having a central aperture **200** fits on the front end **202** of the outer race **190** of the rotational air bearing **152** and receives the inner spindle **188** through its central aperture **200**. A series of semi-circular rings **204** extend from the outer surface of the first clamp **198** to align with bores **206** cut into the chamber wall **208** of the actuator block **162**. A series of retaining holes **210** are equidistantly placed around the clamp **198** to align with bores **212** in the front end of the outer race of the rotational air bearing. Screws **214** or other like means are used to secure the first clamp **198** to the front end **202** of the outer race **190** of the rotational air bearing **152** utilizing the aligned bores **210** and **212**. The outwardly extending rings **204** on the first clamp **198** align with the bores **206** cut into the chamber wall of the actuator block. A second doughnut shaped clamp **216** fits over the first clamp **198** having outwardly extending rings **218** that align over the rings **204** of the first clamp **198** and over the corresponding bores

206 in the chamber wall of the actuator block **162**. Bolts **220** or other means are threaded through the rings of the second **218** and first **198** clamp thereby securing the rotational air bearing **152** within the actuator block chamber **172**, where the font end **222** of the spindle **188** extends to the circular opening in the actuator block's front face **184**. It is envisioned that the rotational air bearing **152** could be secured with the actuator block **162** in any number of ways, all of which are considered to be within the scope of the present invention.

The front face **222** of the spindle **188** of the rotational air bearing **152** defines a series of equidistantly spaced holes **224** which receive screws **226** or bolts used to secure the disc spaced adaptor plate **170** onto the rotational spindle **188**. The adaptor plate **170** is secured to and rotates with the rotational air bearing spindle **188**. A threaded stud **228** extends horizontally from the center of the adaptor plate, the stub aligned with the rotational air bearing axis of rotation, and receives and secures an E-block assembly **164** (see below). Between the centrally located stud **228** and outer circumference **230** of the adaptor plate **170**, an alignment pin **232** extends for facilitating the orientation of the E-block assembly **164** during installation on the adaptor plate **170**. In addition, a corner cube **234**, used to communicate the adaptor plate's angular displacement, is held on the adaptor plate **170** through glue or a retainer/pin arrangement **236** as shown in **FIG. 4**.

As previously mentioned, the E-block assembly **164** is positioned on the stud **228** and alignment pin **232** located on the front face of the adaptor plate **170**. An elongated bolt **238** attaches the E-block **164** to the adaptor plate **170** (see **FIG. 7**) so that actuator arms **240** extend in the vertical plane, or substantially perpendicular, to the rotational air bearing's axis of rotation, as indicated by line **242**. Attached to the distal end of each actuator arm **240** of the E-block is a load beam assembly or two facing load beam assemblies, having associated servo-recording heads **140** thereon for servo-recording to the disc **108** located on the spindle motor hub assembly **142** (see **FIG. 8**).

FIG. 5 illustrates a perspective exploded view of the rear face **186** of the actuator block **162**. A stator **244** of the DC torque, brushless motor **246** is glued adjacent the back end of the rotational air bearing **152** within the chamber **172**. The stator **244** controls the rotational movement of the spindle **188** of the rotational air bearing **152** in conjunction with a trigger plate **248** and optical switches **250** as is well known in the art.

In use, actuation of the motor **246** causes a corresponding rotational movement of the rotational air bearing **152** about its axis of rotation **242**, which causes the rotation of the E-block assembly **164** about the rotational air bearing axis of rotation **242**. The rotational movement of the E-block assembly **164** about the rotational air bearing axis of rotation has a very small level of eccentricity and thereby provides for extremely accurate servo-recording head **140** positioning. In addition, rotation about the air bearing **152** results in much lower levels of friction, especially as compared to conventional ball bearings, thereby providing for minimal levels of vibration during positioning of the servo-recording heads over the disc surfaces.

As shown in **FIGS. 6** and **7**, the bottom face **252** of the actuator block **162** defines a translational air bearing **150**. The translational air bearing **150** includes a groove **254** that extends around the periphery of the bottom face **252** of the actuator assembly, having two or more equally spaced air ports **256** for receiving pressurized air (not shown) into the groove. A planar landing **258** is on either side of the groove **254**, where the two planar landings **258** are substantially parallel to each other and to the top surface of the platform **148**. The first landing **260** extends from the groove **254** to the outer edge **262** of the bottom face **252** of the actuator assembly and the second landing **264** extends a uniform distance from the groove **254** until the start of a centrally located recess **266** within the bottom face of the actuator assembly. A vacuum port **268** is positioned within the recessed **266** bottom face of the actuator assembly.

The groove **254** in preferred embodiments of the present invention is preferably from 0.005 to 0.050 inches deep and is more preferably approximately 0.015 inches deep. The centrally located recess **266** in the bottom face **252** of the actuator assembly is preferably from 0.002 to 0.010 inches deep, and is more preferably approximately 0.005 inches deep. The shape of the groove **254** is preferably a square having rounded off corners. In use, when the actuator block **162** needs to be translationally moved over the platform **148**, an air source (not shown) supplies pressurized air to the groove via ports **256**. The pressurized air raises the actuator block **162** off the platform **148** and is substantially kept within both the grove **254** and within the recess **266** thereby providing a float between the bottom face **252** of the actuator block and the top surface of the platform **148**. When the actuator block **162** needs to be secured in one of the desired positions on the platform, the pressurized air is removed and a vacuum applied to the bottom face of the actuator block by pulling a vacuum through the vacuum port **268** by the

vacuum chuck **144**. The co-planar landings **258** on either side of the groove **254** provide a substantially air tight connection between the actuator block and the platform.

FIG. 9 is a process flow diagram showing the steps for positioning and rotating a servo-recording head in relation to a disc surface utilizing one embodiment of the present invention. In operation **500**, a disc pack is loaded onto the multi-disc servo-track writer **136** for servo-track recording onto each disc **108**. In operation **502**, a satisfactory amount of air is applied to a translational air bearing in the actuator assembly **134** to provide a float between the actuator assembly **134** and the platform **148**. In operation **504**, a slide mechanism **154** that connects the actuator assembly to the platform **148** is actuated to laterally move the actuator assembly **134** into a servo-recording position. In operation **506**, a vacuum chuck **144** pulls a vacuum on the actuator assembly **134** to secure the assembly in the required servo-recording position. In operation **508**, a motor **168** is actuated to rotate the rotational air bearing **152** for unloading the servo-recording heads from a comb **169** and positioning the servo-recording heads **140** on the disc surfaces **138**. In operation **510**, a servo-pattern is recorded on each of the target disc surfaces. In operation **512**, the servo-recording heads **140** are removed from the disc surfaces **138** upon completion of servo-pattern recording and stored back on the comb **169**. In operation **514**, air pressure is added to the translational air bearing **150** to re-establish the float between the actuator assembly **134** and the platform **148**. In operation **516**, the slide mechanism **154** laterally moves the actuator assembly **134** to a non-servo-pattern recording position and the disc stack is removed from the multi-disc servo-track writer **136**. In operation **518**, servo-recorded discs **108** are removed from the disc stack and installed into target disc drives such as disc drive **100**.

In summary, an embodiment of the present invention may be viewed as an actuator assembly (such as **134**) for use in a multi-disc track writer (such as **136**) for recording information on one or more data storage discs (such as **108**) that includes an actuator block (such as **162**) having a central cavity therein (such as **172**) and a rotational air bearing (such as **152**) housed within the central cavity (such as **172**) of the actuator block (such as **162**) for supporting an E-block (such as **164**) having one or more elongated actuator arms (such as **240**) each carrying at a distal end thereof one or more transducers (such as **140**) each for recording the information on a disc surface.

The actuator assembly (such as **134**) has a translational air bearing (such as **150**) formed on a bottom face (such as **252**) of the actuator block (such as **162**) operable when moving the

actuator assembly over a platform surface (such as **148**) between a first servo-recording position and a second disc loading and unloading position. A slide mechanism (such as **154**) is used for laterally moving the actuator block (such as **162**) on an air cushion provided by the translational air bearing (such as **150**) between the first and second positions. The translational air bearing has a groove (such as **254**) juxtaposed between two planar lands (such as **260** and **264**) on the actuator block bottom face (such as **252**) that extend around a centrally located recess (such as **266**) in the bottom face (such as **252**) of the actuator block (such as **162**).

The actuator assembly (such as **134**) rotational air bearing (such as **152**) has a rotatable spindle (such as **188**) and an adaptor plate (such as **170**) fastened between the rotatable spindle (such as **188**) of the rotational air bearing (such as **152**). The adapter plate (such as **170**) supports the E-block (such as **164**). The rotational air bearing has an axis of rotation substantially parallel to the surface of the platform (such as **148**). The actuator assembly (such as **134**) has one or more elongated actuator arms (such as **242**) oriented substantially perpendicular to the rotational air bearing axis of rotation and has a motor (such as **246**) coupled to the rotational air bearing spindle (such as **188**). A corner cube (such as **234**) participates in providing positional information for controlling the motor (such as **246**) to position the E block (such as **164**) carrying the transducers (such as **140**) over the disc surfaces. The actuator assembly also has a stop (such as **182**) positioned on the actuator block adjacent the platform surface (such as **148**) and a catch block (such as **187**) extending from the platform (such as **148**). The actuator assembly (such as **134**), moving on the translational air bearing (such as **150**), is positioned in the servo-recording position when the stop (such as **182**) interacts with the catch (such as **187**).

An embodiment of the present invention may alternatively be viewed as a method for positioning a servo-recording head (such as **118**) over a disc (such as **108**) in a multi-disc track writer (such as **136**) wherein the servo-recording head (such as **140**) is on an actuator assembly (such as **134**) coupled to a platform (such as **148**) surface by an actuator block (such as **162**) and the disc (such as **108**) is on a spindle hub (such as **142**) coupled to a spin motor (such as **143**) fastened to the platform surface. The method includes the steps of:

(a) applying gas pressure to a translational gas bearing (such as **150**) on a bottom face (such as **252**) of the actuator block (such as **162**) to provide a float between the actuator assembly (such as **134**) and the platform (such as **148**);

(b) laterally moving the actuator assembly (such as **134**) on the translational gas bearing (such as **150**) to a servo-recording position (such as **158**);

(c) removing the gas pressure from the translational gas bearing (such as **150**);

(d) pulling a vacuum on the translational gas bearing (such as **150**) to immobilize the actuator assembly (such as **134**) against the platform surface in the servo-recording position (such as **158**);

(e) applying gas pressure to a rotational gas bearing (such as **152**) in the actuator block (such as **162**), the rotational gas bearing supporting the servo-recording head (such as **140**); and

(f). rotating the servo-recording head (such as **140**) on the rotational gas bearing (such as **152**).

The translational gas bearing (such as **150**) on the bottom surface (such as **252**) of the actuator block (such as **162**) has a groove (such as **254**) juxtaposed between two planar landings (such as **258**) that receives pressurized gas and that extends around a centrally located recess (such as **266**) in the bottom face of the actuator block. The method further may include steps of:

(g) recording information on the disc (such as **108**);

(h) rotating the servo-recording head (such as **140**) off of the disc;

(i) removing the gas pressure from the rotational gas bearing (such as **152**) in the actuator block (such as **162**);

(j) applying gas pressure to the translational gas bearing (such as **150**); and

(k) moving the actuator block (such as **162**) to a disc loading and unloading position (such as 160).

(l) removing the air pressure from the translational gas bearing (such as **150**); and

(m) pulling a vacuum on the translational gas bearing to immobilize the actuator assembly (such as **134**) in the disc loading and unloading position (such as **160**).

An embodiment of the present invention may also be viewed as an actuator assembly (such as **134**) for recording information onto a disc surface in a multi-disc track writer (such as **136**). The actuator assembly (such as **134**) includes an E-block (such as **166**) having one or more elongated actuator arms (such as **240**), each actuator arm (such as **240**) having a distally located recording head (**140**); and vibration-isolation means for rotating the E-block (such as **166**) in the

actuator assembly (such as **134**) to position the recording heads (such as **140**) over a disc (such as **108**) surface. The vibration-isolating means for rotating the E-block is preferably a rotational air bearing (such as **152**). The air bearing (such as **152**) has a rotatable spindle (such as **188**) fastened to the E-block assembly (such as **164**). The actuator assembly (such as **134**) also has a means for moving the actuator between a recording position (such as **158**) and a disc loading and unloading position (such as **160**). This means for moving the actuator includes a translational air bearing (such as **150**) and a slide mechanism (such as **154**) for moving the actuator assembly (such as **134**) along a platform (such as **148**) surface.

It will be clear that the present invention is well adapted to attain the ends and advantages mentioned as well as those inherent therein. While a presently preferred embodiment has been described for purposes of this disclosure, various changes and modifications may be made which are well within the scope of the present invention. Numerous other changes may be made which will readily suggest themselves to those skilled in the art and which are encompassed in the spirit of the invention disclosed and as defined in the appended claims.